Low Impact Development (LID) Update

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BUILDING STRONG®

Overview

- Regulations, Requirements, Guidance
- FY13 LID Requirements and Issues
- FY14 LID Guidance
- Army LID Initiatives
- LID Way Ahead

Objective

LID practices will help minimize environmental impacts, resulting from Army's Construction projects, by affecting the quantity and quality of storm water resulting from construction projects.

Statute

Energy Independence and Security Act of 2007 (EISA 2007), **Section 438.** "Storm Water Runoff Requirements for Federal Development Projects state the following:

"The sponsor of any development or redevelopment project involving a Federal Facility with a footprint that exceeds **5,000 square feet** shall use site planning, design, construction, and maintenance strategies for the property **to maintain or restore**, to the maximum extent technically feasible, **the predevelopment hydrology of the property** with regard to the **temperature, rate, volume, and duration of flow."**

Regulatory Guidance/Policies

1. Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (October 5,2009), directed the EPA to issue EISA Section 438 guidance.

2. EPA *Technical Guidance* *on Implementing the Stormwater Runoff Requirements for Federal Projects under Section* 438 *of the Energy Independence and Security Act* (December 2009).

3. DUSD Memorandum: *DoD Implementation of Storm Water Requirements under Section 438 of the Energy Independence and Security Act (EISA),* dated 19 January 2010.

4. ASA Memorandum: *Sustainability Design and Development Policy Update (Environmental and Energy Performance)* dated 27 Oct 2010.

LID Definition

LID concept uses natural design approaches to maintain predevelopment hydrology as a mechanism for pollutant removal and improvement in storm water quality and quantity.

LID is a stormwater management approach with basic principles modeled after nature.

The primary goal of LID is to mimic a site's predevelopment hydrology by managing runoff close to its source through:

- Infiltration
- Filtration
- Storage
- Evaporation
- Detention
- Harvesting

Concept of Low Impact Development Features:

- Minimize storm inlets by sloping parking lots in directions to allow flow from multiple directions into filter basin or other catch method

- Consideration of bio-retention and rain harvesting methods

- Design not to catch 100% of flow, but to slow rate of storm water reaching the stream.

- Make maximum use of existing topography

- Maximize the use of infiltration of storm water to maintain water quality and to slow flow rate and quantity to streams.

LID Best Management Practices (BMPs)

➢ NON-STRUCTURAL BMPs

- Cluster development,
- Minimize soil compaction,
- Minimize total disturbed area,
- Protect natural flow pathways,
- Protect riparian buffers,
- Protect sensitive areas, and
- Reduce impervious surfaces

➢ STRUCTURAL BMPs

- Bioretention (rain gardens)
- Capture Reuse
- Constructed filter
- Detention basin
- Infiltration practices
- Level spreaders
- Native revegetation
- Pervious pavement
- Planter boxes
- Riparian buffer restoration
- Soil restoration
- Vegetated filter strip
- Vegetated roof
- Vegetated swale
- Water quality devices

FY 13 LID Requirements and Issues

➢LID required to be incorporated in 3086 for FY13 MILCON Projects

➢When LID cost were unknown, 2% of supporting facilities cost was used.

FY13 - 3086 LID issues

- Use of concrete structures as LID feature without water harvesting intended.

- Use of concrete structures to achieve water quality

- Difference between Pre-project and Post-project hydrology not known
  - -Requires 95th percentile storm event
  - -knowledge of pre/post project pervious and impervious areas
  - -knowledge of ground surface changes that will be made
    - -soil compaction, grassed areas, etc
    - -roof areas/ paved areas

- Reminder that LID Features are required to manage difference in runoff due to project.

FY14–LID requirements for 1391 and 3086

- LID Cost will be identified with the word LID in front of the description, and under the **Storm Drainage** supporting facility category, such as: ***LID-Bio-Retention feature.***
- Do not include cost of items of work that would have been in contract without LID requirements
- Only consider upgrade of cost for LID feature
- Features of work no longer required should be noted as LID credit.
- If intended LID features of work are not identified, then LID cost is calculated using 2% of the supporting facilities cost on the 1391.
- Planning Charette will require Pre- and Post-project hydrology and determination of storm water required to be managed, due to the project.
- Project Definition Report will require Pre- and Post-project hydrology and storm water required to be managed, and with LID features used for cost refinement.

Army Low Impact Development Initiatives

➢Baltimore District leading the coordination and execution of Army LID Initiatives in concert with SWF and ERDC/CERL:

- LID Technical User Guide final in 4th quarter 2011

- Develop LID Training 3-day Workshop curriculum with first of four scheduled training in Austin, TX week of 28 June

- Six LID Projects at three locations being undertaken by Baltimore District.

- Presenting overview of Army LID Training at USACE Infrastructure Conference in Atlanta, week of 13 June

➢Webinar being scheduled for week of 20 June for LID 101.

Way Ahead

- UFC 3-210-10, Low Impact Development, issued 15 Nov 10.
- Draft Installation Master Planning UFC under review.
- LID cost data from FY13 and FY14 projects **will provide** more **accurate cost** for future years 1391s.
- Develop tracking, reporting, and validating procedures for LID features and costs.

Questions?

BACKUP SLIDES

Rain Garden Cost Estimating

From: http://www.lowimpactdevelopment.org/raingarden_design/cost.htm

Rain garden costs will vary depending on the site preparation that is undertaken and the size of plants selected. If the rain garden is excavated and new growing media installed, it will entail one set of costs. If the rain garden is not excavated and is just amended, costs will be much lower, although the volume of water the garden can handle will be impacted. Determine your quantities for your rain garden and contact local sources for pricing before you start the project.
Items to be cost estimated: Plants, soil amendments, tools, labor, debris removal

Websites:
http://www.lid-stormwater.net/bioretention/bio_costs.htm
http://www.lid-stormwater.net/soilamend/soilamend_costs.htm
http://www.dof.virginia.gov/wq/index.shtml

Bio-Retention Cost

FROM http://www.lid-stormwater.net/bio_costs.htm

A general rule of thumb[1] is that **residential rain gardens** average about **$3 to $4** per square foot, depending on soil conditions and the density and types of plants used. **Commercial, industrial and institutional site costs can range between $10 to $40** per square foot, based on the need for control structures, curbing, storm drains and underdrains. In any bioretention cell design, the cost of plants varies substantially and can account for a significant portion of the facility's expenditures. While these cost estimates are slightly greater than those of typical landscaping treatment (due to the increased number of plantings, additional soil excavation, backfill material, use of underdrains etc.), those landscaping expenses that would be required regardless of the bioretention installation should be subtracted when determining the net cost.

Perhaps of most importance, however, the cost savings compared to the use of traditional structural stormwater conveyance systems makes bioretention cells quite attractive financially. For example, the use of bioretention can decrease the cost required for constructing storm water conveyance systems at a site. A medical office building in Maryland was able to reduce the amount of storm drain pipe that was needed from 800 to 230 feet - a cost savings of $24,000.[2] And a new residential development spent a total of **approximately $100,000** using bioretention cells on each lot instead of nearly **$400,000** for the traditional stormwater ponds that were originally planned.[3] In addition, in residential areas, stormwater management controls become a part of each property owner's landscape, reducing the public burden to maintain large centralized facilities. Detailed cost estimates are given below, as adapted from Prince George's County *Bioretention Manual*.[4]

Cost Guides- Bioretention

Residential Rain Garden

The cost information is the average cost per facility installed, assuming a 100 lot subdivision. All of the facilities have an underdrain system, and many of the facilities will be constructed simultaneously. Planning, designing, and construction costs are all pro-rated as a portion of the overall site cost work, and sediment control, permits, fees, and technical plan approval are required.

•planning phase $95

•design phase $340

•construction phase $3225

•closeout phase $130

TOTAL ESTIMATED COST: **$3,790**

Residential Single Lot

Costs are increased substantially due to the small scale of the project, and closeout is higher due to as-built requirements.

•planning phase $200

•design phase $875

•construction phase $5750

•closeout phase $950

TOT AL ESTIMATED COST: **$7,775**

Cost Guides Bio-Retention

Commercial - New

The facility construction costs are lower than that for a single residential lot because of the increase in related site work. The storm drainage discharge system is not included as part of the bioretention costs since it is treated as a general site expense.

•planning phase $845

•design phase $3600

•construction phase $5237

•closeout phase $675

TOTAL ESTIMATED COST: **$10,357**